

Titan Systems (formerly Intermetrics)

Electronic Transfer of Healthcare Data via the Continuously Available Medical Care (CAMC) Software

When a patient's medical data are transferred between the doctor and the patient via their personal computers (PCs), the benefits can include fewer office visits and the ability to diagnose remotely. This idea has been discussed for many years in medical communities, but it was not until the 1990s that it became feasible. At that time, several technological advances were available that could help to enable this medical data transfer: the development of high-speed data transmission over landline telephone circuits; increased data computation capacity and storage in PCs; and improvements in multimedia, such as the CD-ROM data storage tool.

Intermetrics, a 25-year-old software design company, sought to revolutionize medical data transfer between patient and provider by developing new and specialized software for that purpose. Due to the difficulty of obtaining funding outside its own corporate resources, Intermetrics applied for and won an Advanced Technology Program (ATP) award to develop the Continuously Available Medical Care (CAMC) software. Intermetrics received this award under the ATP focused program, "Information Infrastructure for Healthcare," in 1994.

Although potential buyers, such as the Boston University Medical Center Pilgrim Healthcare Plan, were impressed with the demonstration product, two factors forestalled its development. First, rapid advancements were made in standardized script languages used by web servers, which made the customized script used by the CAMC software obsolete. Second, HealthVision, a healthcare consulting firm, eventually acquired the CAMC software. They did not intend to pursue disease management software development, and therefore, no products have been marketed based on the technology developed during this ATP-funded project.

COMPOSITE PERFORMANCE SCORE

(based on a four star rating)

No Stars

Research and data for Status Report 94-04-0040 were collected during April – June 2004.

Chronically Ill Population Can Be Served by Automation Advances in Home Healthcare

In the mid-1990s, more than 25 million homebound or limited-mobility Americans suffered from the five leading chronic diseases: heart disease, cancer, diabetes, hypertension, and chronic obstructive pulmonary disease. Most of these patients faced frequent and costly visits to doctors or clinics. A 1994 study by Boston University indicated that 75 percent or more of these office visits could be replaced by efficient and comprehensive telemedicine, which involved transmitting patient data over phone lines instead of gathering these data during an office visit.

Intermetrics, a 25-year-old company with a successful record in software design, envisioned new and unique software that could provide a telemedicine solution for thousands of homebound patients. Because funding was very difficult to obtain for this complicated technology development, the company submitted a proposal and received funding from ATP to develop a software tool that would help patients minimize the cost and strain of office visits by providing them (or their caregivers) with a way to transmit vital medical data from their home, nursing home, or assisted living facility. ATP provided the funding as part of the "Information Infrastructure for Healthcare" focused program of 1994. The patient data would be transmitted to a care provider, who would give feedback and

further treatment information. Testing and developing the software, hardware, and demonstration product would be complicated and difficult. ATP helped to facilitate collaboration with Boston University, which would evaluate the prototype's development. To develop the software, Intermetrics subcontracted with Lazo, Gertman, and Associates.

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The team's proposed product, called the Continuously Available Medical Care (CAMC) software, would be installed on both the doctor's and the patient's personal computers (PCs). The patient or the patient's caregiver would transmit medical data to the doctor's office that would normally be collected in an office visit. The software would then analyze the data on the doctor's PC. The doctor's recommendation for treatment, stored in a database, would be transferred back to the patient's PC. During this process, the doctor would also be available online in real time to answer any questions. The software designers' vision was that the patient could report to the doctor, through a telephone line, such data as heart rate, blood pressure, body temperature, heart and lung sounds, and other data as necessary. The CAMC software could access a doctor's computer to report the data and request the appropriate treatment.

Advancements Achieved in Data Transfer Using PCs

The advantages of telemedicine have been well known for years in the medical sector. At the time of Intermetrics' proposal, several factors indicated that it was the right time to explore CAMC technology, including the following:

- PCs had become more powerful with improved memory and data computation capacities.
- Multimedia advances could assist with CAMC functions; for example, CD-ROMs could enable a user to consult a symptom library.

- Videoconferencing could provide a real-time link to the caregiver in a nursing home or the doctor's site. For example, a camera could transmit the current condition of a patient's swollen limb to a doctor.
- For communication between the doctor and the homebound patient, high-speed telephone lines were available. While the lines were not ideal for videoconferencing, they were becoming increasingly cost effective.
- The legislative climate was receptive to healthcare reform. For example, the Veterans Administration could benefit from reform by paying out less in claims by reducing office visits.

Intermetrics planned to market the CAMC software as three products: CAMC Premier for private patients, CAMC for Congregate (Assisted) Living, and CAMC for Nursing Homes. While private patients would be expected to pay for the CAMC service with their own resources, they would experience future cost savings through a significant reduction in the number of office visits they needed. Furthermore, assisted living facilities and nursing homes would pay for the software and updates themselves. (This cost factor may have contributed to their subsequent reluctance to purchase the product.)

The major risk and technical difficulty in developing the CAMC software for these three markets was the customization that was required for each client, which would depend on the patient's medical profile. The database residing on the doctor's PC needed to be customized for each patient's assessment according to the patient's specific illness. For example, a diabetic would need a customized response that was different from a patient with heart disease, because disease-specific symptoms would be monitored, analyzed, and reported by the CAMC software.

Team Defines the CAMC Software Tool Suite Functions

In developing the CAMC software, Lazo, Gertman, and Associates would contribute expertise from its prior prototype development experience in non-CAMC market research. Intermetrics would contribute its expertise in designing, implementing, and standardizing

the script language that the CAMC software used in order to perform its functions. Boston University Medical Center, a third participant in the project, would help to define the requirements for the three tools that would be included in the software's tool suite. These tools would perform the following functions:

- The Data Entry Tool would allow the caregiver to enter patient data into the CAMC software.
- The Plan Tool would use the data that were entered by the Data Entry Tool. The Plan Tool transferred therapeutic care plans to the patient's PC.
- The Customization Strategy Tool would collect information on the patient's condition that the doctor needed to monitor. This tool included a sophisticated questionnaire used to capture information that enabled the software to accurately track the patient's condition, depending on his or her illness.

During the project, the Customization Strategy Tool was the most challenging tool to develop and maintain, due to the large database of patient information that required analysis by the CAMC software. Consequently, this tool required the most testing and code rewrites.

Intermetrics Identifies CAMC Software Markets

Intermetrics' commercialization plan for the CAMC software focused on installing it at institutions such as the Veterans Administration, health maintenance organizations, homecare companies, and state Medicaid providers. Lazo, Gertman, and Associates would retain the rights to commercialize any healthcare applications for the product, while Intermetrics would retain any rights to applications not related to healthcare.

Competing Technology Challenges CAMC Software Development

Intermetrics made efforts during the project to keep pace with the rapid advancements in web-based data transfer technology. For example, in the fourth quarter of 1996, the company contacted Continental

Cablevision to arrange an agreement whereby Continental would transmit the data between patients and doctors over a cable transmission line, which has a higher capacity than a telephone line. However, Continental lost interest in the project when it realized that current laws did not protect Continental from potential liabilities arising from transmitted data.

In this same timeframe, Congress passed the 1996 Health Insurance Portability and Accountability Act (HIPAA). The practical effects of HIPAA neither helped nor hindered CAMC's marketing prospects, as the law initially had no enforcement power. In general, it was unclear to HMOs and to doctors how they were to implement HIPAA. Moreover, CAMC already had built-in, password-controlled security in its software. The appropriate level of security was invoked depending on who accessed the software, so access to personal patient information was controlled, which conformed to one of HIPAA's intents.

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Before the project ended in April 1997, Intermetrics demonstrated the CAMC first-generation software for the Harvard Pilgrim Healthcare Plan, the largest HMO in four New England states. Pilgrim evaluators thought the product had potential, but subsequently Lazo, Gertman, and Associates were not successful in selling a product to Harvard Pilgrim. In the last quarter of the project, Intermetrics delivered the tool suite and the CAMC software library to Lazo, Gertman, and Associates, in keeping with their mutual agreement that Lazo would have commercialization rights to the software. But delays due to technical difficulties forestalled scheduled field trials.

In retrospect, another factor contributing to the failure of Intermetrics' proposed software was the arrival of the web-based server near the end of the project. By that time, the web-based server had become mature enough to challenge the PC-based server because it used a simpler script language, which facilitated improved record access. CAMC developers could not compete with these advancements, which greatly

accelerated the obsolescence of the CAMC software. Unlike the CAMC server on a doctor's PC, the web-based server allowed several patients and doctors to access information simultaneously. This alone was a significant advancement. Internet script language is more standardized than Oracle's, which is what Intermetrics was using to transfer data between the patient's and the doctor's PC.

After the conclusion of the project, Lazo, Gertman, and Associates pursued plans to update the CAMC software with web-enabled script language. The company used a 1997 Small Business Innovation Research grant to pursue web-enablement of the software, which they achieved that same year. The company then changed its name to U.S. Carelink to maximize the software product's marketing prospects, but could not persuade any of its original target clients to buy the software. HealthVision then bought U.S. Carelink in 2001. Through this acquisition, HealthVision hoped to accelerate its entry and dominance into the new frontier of telemedicine. HealthVision did not want to invest further resources, based on a shift in commercial strategy, to upgrade the web-enablement technology to a commercially competitive status in a rapidly changing technology environment. As of 2004, HealthVision was not pursuing any disease management clinical applications, which was the focus of the original CAMC software. The primary research company on the project, Intermetrics, was eventually acquired by Titan Systems in March 2000. Although Titan Systems acquired universal rights to the CAMC software, it has not pursued any applications related to the original technology.

Conclusion

The advancements in personal computers and improvements in data transfer over telephone lines inspired Intermetrics to team with Lazo, Gertman, and Associates to create one of the first software packages for telemedicine data transfer. Their proposed product would create an electronic link between the homebound or limited-mobility patient and a doctor that would reduce the frequency of office visits and speed diagnoses. The team designed software products for three patient sectors: private, assisted living, and

nursing homes. Despite a successful prototype demonstration at Harvard Pilgrim Healthcare Plan, the largest HMO in New England, the product's customized script language became obsolete by rapid advancements in Internet script language and the web-based server. Lazo, Gertman, and Associates successfully added web enablement to the Continuously Available Medical Care (CAMC) software after the project ended. Although they changed their name to U.S. Carelink in an effort to market the product, the company was unsuccessful in selling the software. U.S. Carelink did not want to risk further corporate resources to upgrade web enablement to a truly competitive status in the rapidly advancing world of Internet electronic commerce. HealthVision acquired U.S. Carelink, but did not pursue the technology. Titan Systems, which eventually acquired Intermetrics, also had no interest in upgrading the obsolete technology.

Although this technology did not succeed in the mid-1990s, the need still exists. As of early 2004, President Bush had promised to appoint a national health information technology coordinator at the Department of Health and Human Services. The goal is to set technical standards for the switch from paper to electronic medical records by the end of the year, so that doctors and hospitals can share patient records nationwide.

PROJECT HIGHLIGHTS

Titan Systems (formerly Intermetrics)

Project Title: Electronic Transfer of Healthcare Data via the Continuously Available Medical Care (CAMC) Software (Enterprise Tools for the CAMC Home Healthcare System)

Project: To develop a script language and a related suite of software tools to facilitate the process of developing customized home healthcare workstations for homebound or limited-mobility, chronically ill patients.

Duration: 12/15/1994 - 3/17/1997

ATP Number: 94-04-0040

Funding (in thousands):

ATP Final Cost	\$1,761	71%
Participant Final Cost	<u>729</u>	29%
Total	\$2,490	

Accomplishments: With ATP funding, the team of Intermetrics and Lazo, Gertman, and Associates developed a successful prototype device that transferred data between a patient's computer and a caregiver's computer via a high-speed data access phone line.

Commercialization Status: This product was not commercialized. The intellectual property was acquired by HealthVision, which chose not to further develop it.

Outlook: The outlook for this technology is weak due to product obsolescence caused by rapid advances in Internet technology for transfer.

Composite Performance Score: No Stars

Number of Employees: 6 at project start, 0 as of June 2004

Focused Program: Information Infrastructure for Healthcare, 1994

Company:

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Subcontractors:

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